

2022

ZOOLOGY — HONOURS

Paper : CC-5

Full Marks : 50

*The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.*

Answer question no. 1 and any four questions from the rest.

1. Answer any five questions :

2×5

- (a) State two important differences between primary and secondary gill bars of *Branchiostoma* sp.
- (b) What is diastema? In which animal is it found?
- (c) What is rete mirabilia? State its significance.
- (d) *Ichthyophis* is not a snake. — Why?
- (e) Distinguish between down feather and filoplume.
- (f) What is 'Organ of Jacobson'? In which animal is it found?
- (g) State two mammalian characters of Monotremata.
- (h) What is keratin fibre horn? Where is it found?
- (i) Mention the importance of endostyle in *Branchiostoma*.

2. (a) Place the following animals (any three) in their respective classes and orders with reasons (one character for each taxon) :

Rana sp., *Calotes* sp., *Columba* sp., *Macropus* sp.

(b) Distinguish between cyclostomes and fishes.

(2×3)+4

3. (a) In what respect the metamorphosis of *Ascidia* differs from that of anuran amphibia?

(b) Narrate the steps of metamorphic changes in ascidian tadpole with suitable diagram.

4+(4+2)

4. Define migration. Mention the types of bird migration. State the factors controlling bird migration. How birds navigate during migration?

1+3+3+3


5. (a) What is Paedogenesis? How does it differ from Neoteny?

(b) What are the intrinsic and extrinsic factors involved in Neoteny?

(c) How can an individual bat discriminate between the echos of its own call and those of the other bats?

3+3+4

Please Turn Over

6. (a) Draw and describe the structure of a typical flight feather of birds.
(b) Draw and label the microscopic structure of a typical mammalian hair.
(c) State the important differences between Ratitae and Carinate. (2+2)+3+3
7. (a) Describe the structure of physoclistous swim bladder in fish. How does swim bladder act as an accessory respiratory organ in some fishes?
(b) Discuss the principles and mechanism of aerodynamics of bird flight. (2+3)+5
8. Write short notes on **any two** of the following : 5×2
- (a) Evolution and significance of double circuit heart in vertebrates
✓(b) Accessory respiratory structure in *Anabas* sp.
(c) Structure of ruminant stomach
✓(d) Structure of different types of fangs in poisonous snake.
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ZOOLOGY — HONOURS

Paper : CC-6

Full Marks : 50

*The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.*Answer **any ten** questions.

- ✓ 1. Describe any three types of cartilages with proper diagram. 3+2 ✓
- ✓ 2. Describe neuromuscular junction with suitable diagram. 3+2
- ✓ 3. Draw and describe the mechanism of impulse propagation through chemical synapse. 2+3 3+2 ✓
- ✓ 4. Give a brief account of the role of actin and myosin in muscular contraction with suitable diagram. 3+2
5. Write short notes on the following (**any two**) : 2½×2
 - (a) Electrical synapse
 - ✓ (b) Areolar tissue
 - ✓ (c) Haversian system
 - (d) Red and white muscle fibre.
- ✓ 6. (a) Describe the role of $\text{Na}^+ - \text{K}^+$ ATPase pump in impulse propagation. 3+2
 - (b) Write two important differences between collagen fibre and elastic fibre.
7. State the process of iodine uptake and storage in thyroid gland with a schematic diagram. 2½+2½
8. Describe the histological structure of anterior pituitary gland and mention the names of hormones released by each cell type. 3+2
- ✓ 9. Give a brief account of signal transduction pathway of any one non-steroidal hormone. 5 3+2 ✓
- ✓ 10. Mention the names of different placental hormones and state their functions. 2+3
11. Describe the role of estrogen and progesterone in maintaining menstrual cycle. 2½+2½

Please Turn Over

12. Distinguish between (*any two*) :

- ✓ (a) Steroid and non-steroid hormone
- ✓ (b) Estrous and menstrual cycle
- (c) Bone and cartilage.

33

10 ✓

2½×2

✓ 13. Classify epithelial tissue according to shape of the cells with example.

35

5

✓ 14. Compare the three cortical zones of adrenal gland with reference to structural and functional aspects.

5

15. (a) Mention the location and function of Leydig cells and Sertoli cells.

(b) What is primary ossification centre?

(½+1)×2+2

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ZOOLOGY — HONOURS

Paper : CC-7

(Fundamentals of Biochemistry)

Full Marks : 50

*The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.*Answer *question no. 1* and *any four* from the rest.1. Answer *any five* questions :

- (a) Define essential amino acid with two examples.
- (b) State the sources of NADPH during fatty acid synthesis.
- (c) Define anomerism.
- (d) State the role of temperature on enzyme activity.
- (e) State the function of hexokinase and phosphofructokinase.
- (f) What is proton-motif force?

2×5

} 10

- 2. (a) Explain briefly the purine salvage pathway.
- (b) Write a note on oxidative deamination.
- (c) Define isozyme with example.

5+3+2

3. (a) Distinguish between :

- (i) Nucleoside and nucleotide
- (ii) Saturated and unsaturated fatty acid
- (iii) Glycosidic linkage and peptide linkage.

(b) Define glucogenic and ketogenic amino acids with example.

(2×3)+(2+2)

- 4. (a) Define K_m with significance.
- (b) Explain competitive and non-competitive inhibition.
- (c) Give an example of a competitive inhibitor.

} 10

(2+2)+(2½+2½)+1

- 5. (a) Discuss with a flow chart of the process of β -oxidation of linoleic acid.
- (b) Describe urea cycle with a flow chart.

} 10

5+5

Please Turn Over

6. (a) What is redox potential?
(b) What are the functions of the following classes of enzymes? Give example :
(i) isomerase
(ii) oxido-reductase
(iii) transferases.
(c) Define oxidative phosphorylation.

2+(2×3)+2

- ✓ 7. State the functions of the following enzymes :

2×5

- (a) Transketolase
(b) Aldolase
(c) Pyruvate kinase
(d) Palmitoyl thio-esterase
(e) Citrate synthase.

3 10

8. Write short notes on (*any two*) :

5×2

- (a) Salting out of protein
✓ (b) Electron transport chain
✓ (c) Pentose phosphate pathway (structure not required)
(d) F_0-F_1 particle.

3 10

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ZOOLOGY — HONOURS**Paper : SEC-A-1****(Apiculture)****Full Marks : 80***The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.***Group - A**Answer *any twenty* questions.

2×20

- ✓ 1. Cite an example of non-apic bee found in India with its distribution and host-plant.
- ✓ 2. What is bee wax? Name the natural enemies of honeybee.
- ✓ 3. State the chemical composition and economic importance of bee wax.
- ✓ 4. How would you identify the Queen bee in terms of morphology and activity?
5. Distinguish between worker cells and drone cells of a beehive.
- ✓ 6. What is Pollen Basket? State its function.
- ✓ 7. What do you mean by absconding swarm and mention its significance.
- ✓ 8. Write the composition of bee venom.
- ✓ 9. What is propolis? Mention its significance.
- ✓ 10. Which type of hive is popular for rearing honeybees in India and why?
- ✓ 11. What are the reasons for dividing a bee colony?
- ✓ 12. What are the benefits and significance of bee pollination?
- ✓ 13. Write a brief note on pests for honeybee colonies in India and mention the conditions of infestation.
14. What is migratory beekeeping? Why is it necessary?
- ✓ 15. Enlist the suitable crops for bee colony migrations mentioning their suitability.
- ✓ 16. What do you mean by nuptial flight? Mention its significances.
17. How many times Queen bee larvae moult before pupation and how long pupal stage lasts?
- ✓ 18. Name the largest and smallest bee found in India along with their distribution.

Please Turn Over

- ✓19. What is bee pasturage and what is their significance?
- ✓20. Write a short note on sting development in bees.
- ✓21. Why use of liquid smoke is referred in beekeeping industry?
- ✓22. Mention causative agents of American foulbrood disease and European foul brood disease in bees.
23. Write the suitability of *Apis florea* for artificial rearing.
24. What is pollen supplement? Why pollen supplement is required for bee colony?
- ✓25. Mention the scientific names of two avian fauna feed primarily on honeybee and bee wax.

Group - B

Answer *any eight* questions.

5×8

- ✓26. How is nectar transferred into honey by honeybees? State the chemical composition and nutritive values of honey.
 - ✓27. Elucidate briefly the nature of damage caused by a parasite and bacteria to the honeybees. Leave a note on their respective control measures.
 - ✓28. What is dance language hypothesis? Explain the dance phenomenon and its significance with examples.
 - ✓29. How castes are formed in a bee colony? What should you observe while inspecting a hive?
 30. Discuss the existing problems of apiculture in India and mention how to overcome it.
 31. With logical interpretations, write the major factors responsible for selecting a site for apiary. Is there any correlation between a site and honey production?
 - ✓32. Which qualities of honeybees make them most efficient pollinators? How honeybee colonies can be managed for crop yield?
 33. How assessment of demand is done to start a beekeeping business in India?
 - ✓34. Write the composition of honey and bee wax. Mention medicinal values of bee venom.
 - ✓35. What is Newton Box? Discuss hot-bath methods of bee wax extraction with diagram.
 - ✓36. Write a short note (Pathogen, Symptoms and Control) on clustering disease of honeybees.
 37. Write recent development, importance and problems of beekeeping in India.
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